Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **M.TECH**

P2TFCC12

2nd Semester Regular Examination – 2016-17

ADVANCED INTERNAL COMBUSTION ENGINES

BRANCH(S): THERMAL & FLUID ENGG

Time: 3 Hours

Max Marks: 100

Q.CODE:Z952

Answer Question No.1 which is compulsory and any four from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** (2 x 10)

a) Differentiate between air injection & solid injection system.
b) What do you mean by charge stratification?
c) Define fuel rating of CI & SI engine.
d) Mention the stages of combustion in CI engine with sketch.
e) What is the use of combustion charts?
f) Discuss the effect of time loss & dissociation on fuel air cycle.
g) What modifications are necessary for a supercharged engine?
h) What are various methods for measuring friction power?
i) What alternative fuels can be considered for SI engine from exhaust emission point of view.
j) List out some factors which affect the carburetion process.

Q2 a) Discuss various methods of cooling systems used in IC engine withsketch and relative merits and demerits. (10)

b) The air flow to a 4 cylinder 4 stroke oil engine is measure by means of4 cm diameter orifice having a coefficient of discharge of 0.75. During atest on the engine the following data are recorded. (10)
Bore=11 cm, stroke=10.5 cm, engine speed=1000 rpm, braketorque=120 N-m, fuel consumption= 4 kg/h, CV of fuel=42000 kJ/kg,head across orifice =5 cm of water, atmospheric temperature=20°C,atmospheric pressure=1 bar. Calculatei)Thermal efficiency ii) BMEP iii)Volumetric efficiency based onatmospheric condition.

Q3 a) Explain Exhaust emissions, its measurement and control in IC engine. (10)

b) What is the effect of supercharging; Describe the limitation for SI & CI engine. (10)

Q4 a) Explain the various factors affecting delay period in CI engine. (10)

b) The entire output of a supercharged 4-s engine is used to drive an air compressor. Theair enters the compressor at 25^0C & is delivered to cooler which removes heat at a rate of 1200 KJ/min. The air leaves the cooler at 50^0C and 1.5 bar. Part of this air flow is used to supercharge the engine has a volumetric efficiency of 70% based on induct manifold condition of 50^0C & 1.5 bar. The engine has 4 cylinder of 70 mm bore & 110 mm stroke runs at 2100 rev/min & delivers an output torque 140 Nm. Mechanicalefficiency is 70%. (10)
Find a)IMEP b) air consumption in kg/min.

Q5 a) Describe a high tension magneto ignition system and compare its advantage &disadvantage with coil ignition system. (10)

b) What is advantage ofVCR engine?Discuss any method to obtain variable ratio. (10)

Q6 a) Discuss the various stages of normal and abnormal combustion in SIengines with a sketch. (10)

b) In an engine If mass fraction of products remains in clearance space is 0.05 and 0.0850 kg of fuel is present. Find mass of residual in chart,mass of fresh charge,fresh fuel in charge. (10)

Q7 **Write short notes (on any two)** (10 x 2)

a) Dual fuel engine &Wankel rotary engine.
b) Fuel air & actual cycle
c) Fault diagnosis of IC engine.
